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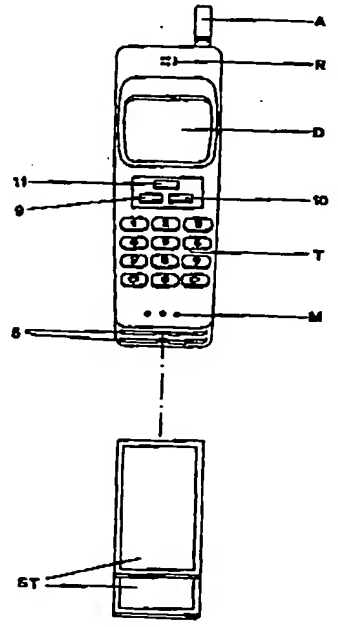
(54) Title: AN ELECTRONIC DEVICE FOR THE FUNCTIONAL DOUBLING WITH MULTIPLE CARDS OF CELLULAR TELEPHONES AND SIMILAR

(57) Abstract

The electronic device for the functional doubling with multiple cards of cellular telephones, according to the present invention, allows to insert in the same cellular phone, a plurality of different cards and, possibly, of different providers, so as to choose each time the most convenient solution, comprising for that purpose localizations inside said cellular telephone and functionality means which allow: a manual selection of the used card, so as to allow the reception only of those calls having a preferential feature; an automatic selection of said card, according to the user's number the entering call is directed to, allowing in fact the use of all numbers of the cellular phone; the possible utilization of telephone cards belonging to different providers, with the possibility of automatic selection of the most convenient card.



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04Q7/32

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04Q H04B G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	DE 43 02 820 A (MANNESMANN AG) 20 October 1994 see abstract see page 2, line 44 - page 3, line 32; figures 1-3	1,10,11

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[X] Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search	Date of mailing of the international search report
12 November 1998	20/11/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Fuchs, P

Form PCT/ISA/210 (second sheet) (July 1992)

"AN ELECTRONIC DEVICE FOR THE FUNCTIONAL DOUBLING WITH MULTIPLE CARDS OF CELLULAR TELEPHONES AND SIMILAR"

The present invention concerns an electronic device for the functional doubling with multiple cards of cellular telephones, which may receive and perform telephone calls using different telephone numbers coupled with the same cellular telephone.

It is well known that at present there are contract telephone cards and cards until exhaustion of the utilization costs, which vary according to the hours of the day; furthermore, different coverings of the telephone signal on the territory are provided due to the presence, on the market, of different providers of the service.

It is the aim of the present invention to have, on the same cellular phone, a plurality of different cards and, possibly, of different providers, so as to choose each time the economically most convenient solution and to be found on all telephone numbers owned.

The aim set forth is reached by means of the electronic device for the functional doubling with multiple cards of celular telephones and similar, according to the present invention, comprising localizations inside said cellular telephone and functionality means which allow:

- a manual selection of the used card, so as to allow the reception only of those calls having a preferential feature;
- an automatic selection of said card, according to the user's number the entering call is directed to, allowing in fact the use of all numbers of the cellular telephone;
- the possible utilization of telephone cards belonging to different providers, with the possibility of automatic selection of the economically most convenient card according to the hour in which the telephone is used.

The advantages of the device according to the present invention are many and considerable:

- convenience of the service due to the possibility of choosing the most suitable solution according to the place and the hour of the telephone call;
- a more complete covering of the territory;
- the possibility of inactivating determined telephone numbers, leaving free access to calls connected to business and possibly to private calls.

The present invention will be described more in detail hereinbelow relating to the enclosed drawings in which some embodiments are shown.

Figure 1 shows an axonometric view of a cellular phone comprising the device according to the present invention,

for the contemporary use of a plurality of telephone cards, shown in exploded view.

Figure 2 shows a block scheme of the functioning of the device according to the present invention to be applied to a cellular phone for transforming the same into a multi-card telephone, provided with the manual or automatic selection functions.

Figure 3 shows an electronic block scheme of the functioning of a multi-card cellular phone, provided with the device for the automatic selection according to the hour in which the telephone card is used, with the lowest managing costs.

Figure 4 shows an axonometric view of a cellular phone provided with a multitrack telephone card reader.

Figure 5 shows in a block scheme the functioning of the cellular phone according to figure 4.

Figure 6 shows an axonometric view of a multiple reader of telephone cards, that may be used in combination with known cellular phones, and the functioning whereof is shown in a block scheme in figure 7.

The enclosed figures show an electronic device for the functional doubling with multiple cards of cellular telephones, comprising:

- a selecting circuit 1, provided with a processing unit 2 for the control of the electronic switch that can divert the access of the cpu 8 towards the system memories 4, in which the data relating to the telephone card in its utilization phase are contained;
- a plurality of readers 5 of telephone cards ST, provided with activation sensors 6;
- an interface 7, for the transfer of the data concerning the telephone cards present in readers 5 towards the system memories 4;
- a cpu 8 which is expressly prepared for interacting with above mentioned elements and can provide the base functionality of a common cellular phone.

A cellular phone provided with the device according to the present invention, further comprises:

- an aerial A for both transmitting and receiving ;
- a radio impulse provider G;
- a receiver R and a microphone M;
- a display D, managed by the video interface I;
- a multifunctional keyboard T, provided with the functional keys 9, 10, 11, necessary for activating the additional functionality provided by the cellular phone.

Referring now in detail to the variant of the device according to the present invention, show in figures 1 and 2, the functionig of the same may be described as follows:

- the insertion of a telephone card into one of the readers 5 determines the noticing of the same by the sensors 6 and the consequent activation of the interface 7, for the transfer of the data concerning the inserted card (kind of the card, user's number, transmission frequency, etc.), into the system memories 4 connected to the used reader;
- if, on the contrary, a card is removed from the cellular phone, said sensors 6 signal to the interface 7 to proceed to cancelling the system memories concerning the no longer used reader;
- the programming of the functioning way of the device according to the present invention takes place by means of the function keys 9, 10 which respectively allow to connect or not the automatic selection of the telephone card to whose number the entering call relates to, and to manually select the card relating to the phone number that is to be activated, so that the functioning ways selected and the phone numbers made operative are visualized by the cpu 8 onto the display D by means of video interface I;
- if the automatic selector 1 is activated, the radio impulses received by aerial A and decodified by the radio impulse provider G, arrive to processing unit 2

which notices the phone number the entering call relates to, activates the electronic switch 3, limiting the access of the cpu 8 only towards the specific memory bank 4 in which the data of the phone card corresponding to the phone number requested by the entering call are stored;

- once the informations requested by the system memory are obtained, cpu 8 can perform the connection with the calling phone, establishing with the latter a two-direction full-duplex communication, in which the radio signals picked up by aerial A will be demodulated by the impulse provider G and sent to receiver R, in the same time in which the electric impulses coming from the microphone M are suitably modulated by the impulse provider 2, for transmission through aerial A.

If prepaid cards are used, the cpu 8 will provide to deduct, during the call, the cost of the running call updating it constantly through the interface 7 of the magnetic readers 5, and visualizing the residual credit of said card onto the display D.

Relating now to the variant shown in figure 3, the cellular phone is provided with a check device 12 for the automatic selection of the telephone card which, among the installed ones, offers the lowest costs according to the hour in which said phone is used.

In that case, said device 12 may determine - if activated by means of special function key 11 - the hour in which the cellular phone has been used by means of the system clock 0, and may find, by checking the system memories 4, the telephone card that offers the lowest costs according to the hour in which said phone is used.

Now the same check device operates the electronic switch 3 so that the cpu 8 makes use of the memory 4 banks containing the data relating to said card for starting the conventional procedures of telephonic connection.

The variant of the device according to the present invention of figures 4 and 5 shows a cellular phone provided with a reader 13 specifically planned for the use of the special multi-track telephone cards 15, which have on their surface a plurality of magnetic tracks 16, each containing the informations usually stored onto one single card of known kind.

Inside said readers 13, reading and writing means 14 are provided in a number equal to the one of the magnetic tracks 16 on said cards 15 which, managed by a special interface 17, allow the transfer of the data from cards 15 to system memories 4 and, if necessary, the updating of the data contained therein.

Figures 6 and 7 concern a multiple telephone card ST reader 18 of known kind, that may be used with common cellular phones not arranged for the multi-card functioning, consisting of the following elements:

- a connection card 19, for the connection of the device to common cellulars;
- a codified impulse generator 20;
- two or more readers 5' of telephone cards ST, managed by cpu 21 of the multiple reader 18, by means of dedicated interface 22;
- function keys 23, 24, respectively for the selection of the used card and for the sending of the data of the same to the connected cellular;
- a display D1, controlled by cpu 21 by means of a video interface 11.

The multiple reader 18 is connected, by means of the connection card 19, to common cellulars exploiting the card readers 5 of the latter, while the ST cards are inserted into the readers 5' provided in the device and selected each time according to the telephone number that is to be operated on the cellular phone.

The functioning of said variant may be described as follows:

- the selection of the telephone card to be used is performed by means of the function key 23, that prepa-

res the interface 22 for the access to the reader 5' in which the chosen card has been inserted, and at the same time it orders the cpu 21 of said multiple reader 18 to visualize the data of the same onto the display D1, by means of the video converter I1;

- when function key 24 is pressed, cpu 21 gets to reader 5' by means of interface 22 - said reader 5' containing the selected card -, collects the data contained therein and sends them, suitably codified by impulse generator 20, through connection card 19 to the cellular phone to which the multiple reader 18 is connected;
- said data are received by reader 5 of the cellular phone which reads them as the insertion into the same of a new telephone card, and transfers them into the system memories 4, thus preparing the cpu 8 of the cellular phone to the use thereof during the telephone connection procedures.

CLAIMS

1. An electronic device for the functional doubling with multiple cards of cellular telephones, which may receive and perform telephone calls using different telephone numbers coupled with the same cellular phone, comprising localizations inside said cellular phone and functionality means which allow:
   - a manual selection of the used card, so as to allow the reception only of those calls having a preferential feature;
   - an automatic selection of said card, according to the user's number the entering call is directed to, allowing in fact the use of all numbers of the cellular telephone;
   - the possible utilization of telephone cards belonging to different providers, with the possibility of automatic selection of the economically most convenient card according to the hour in which the telephone call is performed;

   characterized in:
   - a selecting circuit (1), provided with a processing unit (2) for the control of the electronic switch that can divert the access of the cpu (8) towards the system memories (4), in which the data relating to the telephone card in its utilization phase are contained;
   - a plurality of readers (5) of telephone cards (ST), provided with activation sensors (6);

- an interface (7), for the transfer of the data concerning the telephone cards present in readers (5) towards the system memories (4);
- a cpu (8) which is expressly prepared for interacting with above mentioned elements and can provide the base functionality of a common cellular phone.

2. A device according to claim 1, characterized in that the insertion of a telephone card into one of the readers (5) determines the noticing of the same by the sensors (6) and the consequent activation of the interface (7), for the transfer of the data concerning the inserted card into the system memories (4) connected to the used reader, while if a card is removed from the cellular phone, said sensors (6) signal to the interface (7) to proceed to cancelling the system memories concerning the no longer used reader, with a programming of the functioning way of the device according to the present invention occurring by means of the function keys (9, 10) which respectively allow to connect or not the automatic selection of the telephone card to whose number the entering call relates to, and to manually select the card relating to the phone number that is to be activated, so that the functioning ways selected and the phone numbers made operative are visualized by the cpu (8) onto the display (D) by means of video interface (I).

3. A device according to claim 1, characterized in that if the automatic selector (1) is activated, the radio impulses received by aerial (A) and decodified by the radio impulse provider (G), arrive to processing unit (2) which notices the phone number the entering call relates to, activates the electronic switch (3), limiting the access of the cpu (8) only towards the specific memory bank (4) in which the data of the phone card corresponding to the phone number requested by the entering call are stored.

4. A device according to claim 1, characterized in that once the informations requested by the system memory are obtained, cpu (8) can perform the connection with the calling phone, establishing with the latter a two-direction full-duplex communication, in which the radio signals picked up by aerial (A) will be demodulated by the impulse provider (G) and sent to receiver (R), in the same time in which the electric impulses coming from the microphone (M) are suitably modulated by the impulse provider (2), for transmission through aerial (A).

5. A device according to claim 1, characterized in that if prepaid cards are used, the cpu (8) will provide to deduct, during the call, the cost of the running call updating it constantly through interface (7) of magnetic readers (5), and visualizing the residual credit of said card onto display D.

6. A device according to claim 1, characterized in a check device (12) for the automatic selection of the telephone card which, among the installed ones, offers the lowest costs according to the hour in which said phone is used, while said device (12) may determine - if activated by means of special function key (11) - the hour in which the cellular phone has been used by means of the system clock (0), and may find, by checking the system memories (4), the telephone card that offers the lowest costs according to the hour in which said phone is used.

7. A device according to claim 1, characterized in that said check device (12) operates the electronic switch (3) so that the cpu (8) makes use of the memory (4) banks containing the data relating to said card for starting the conventional procedures of telephonic connection.

8. A device according to claim 1, characterized in a reader (13) specifically planned for the use of the special multi-track telephone cards (15), which have on their surface a plurality of magnetic tracks (16), each containing the informations usually stored onto one single cards of known kind.

9. A device according to claim 1, characterized in that inside said readers (13), reading and writing means (14) are provided in a number equal to the one of the magnetic

tracks (16) on said cards (15) which, managed by a special interface (17), allow the transfer of the data from cards (15) to system memories (4) and, if necessary, the updating of the data contained therein.

10. A device according to claim 1, characterized in a multiple telephone card (ST) reader (18) of known kind, that may be used with common cellular phones not arranged for the multi-card functioning, consisting of the following elements:
- a connection card (19), for the connection of the device to common cellulars;
- a codified impulse generator (20);
- two or more readers (5') of telephone cards (ST), managed by cpu (21) of the multiple reader (18), by means of dedicated interface (22);
- function keys (23, 24), respectively for the selection of the used card and for the sending of the data of the same to the connected cellular;
- a display (D1), controlled by cpu (21) by means of a video interface (I1).

11. A device according to claim 1, characterized in that the multiple reader (18) is connected, by means of the connection card (19), to common cellulars exploiting the card readers (5) of the latter, while the (ST) cards are inserted into the readers (5') provided in the device and

selected each time according to the telephone number that is to be operated on the cellular phone, so that said data are received by reader (5) of the cellular phone which reads them as the insertion into the same of a new telephone card, and transfers them into the system memories (4), thus preparing the cpu (8) of the cellular phone to the use thereof during the telephone connection procedures.

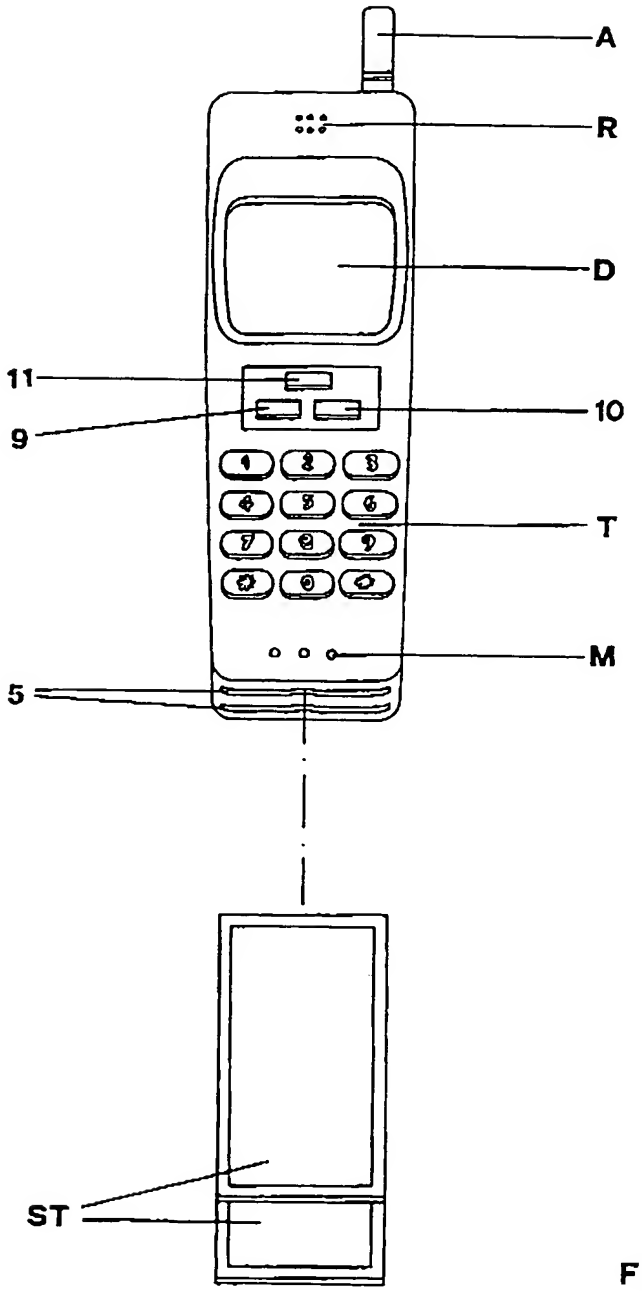

FIG.1

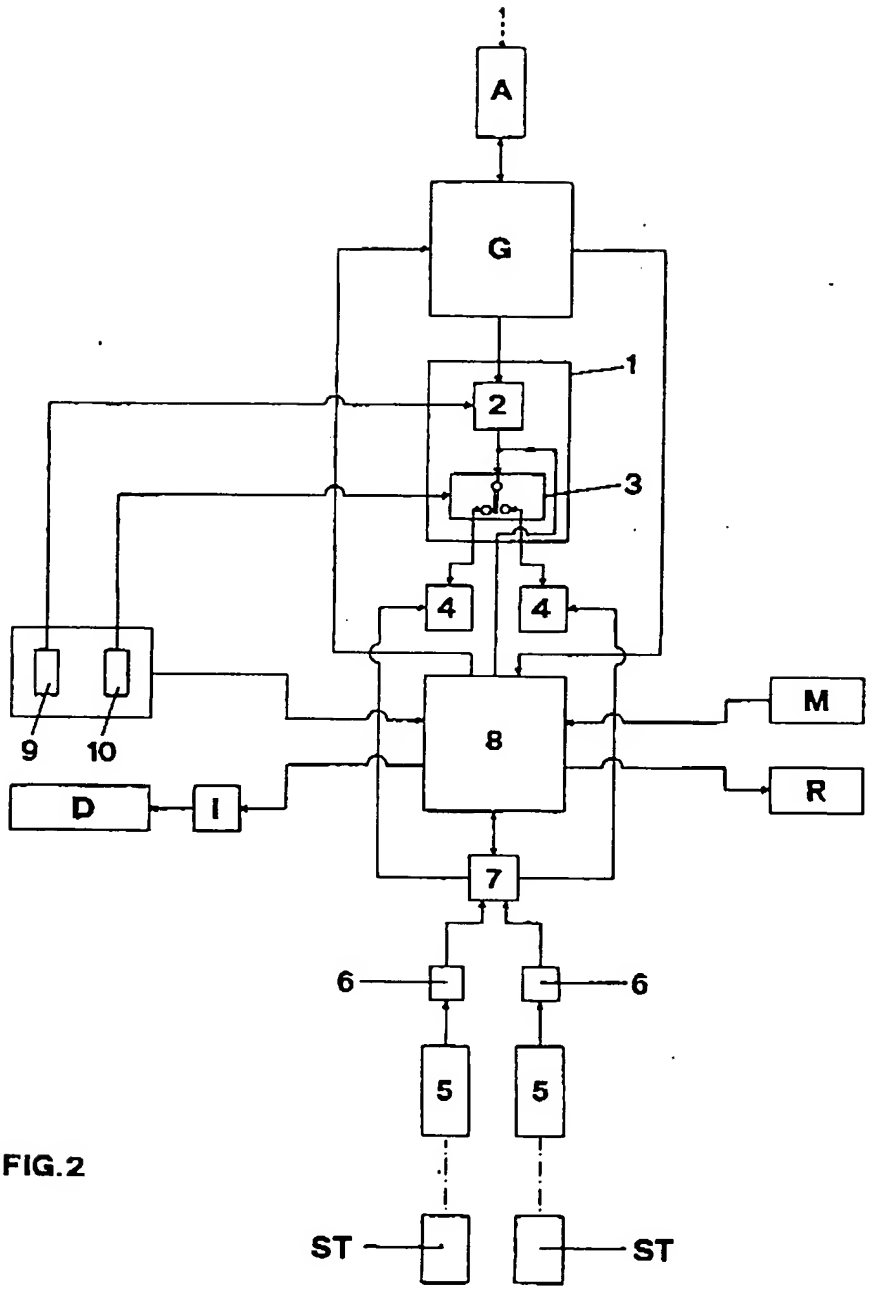

FIG.2

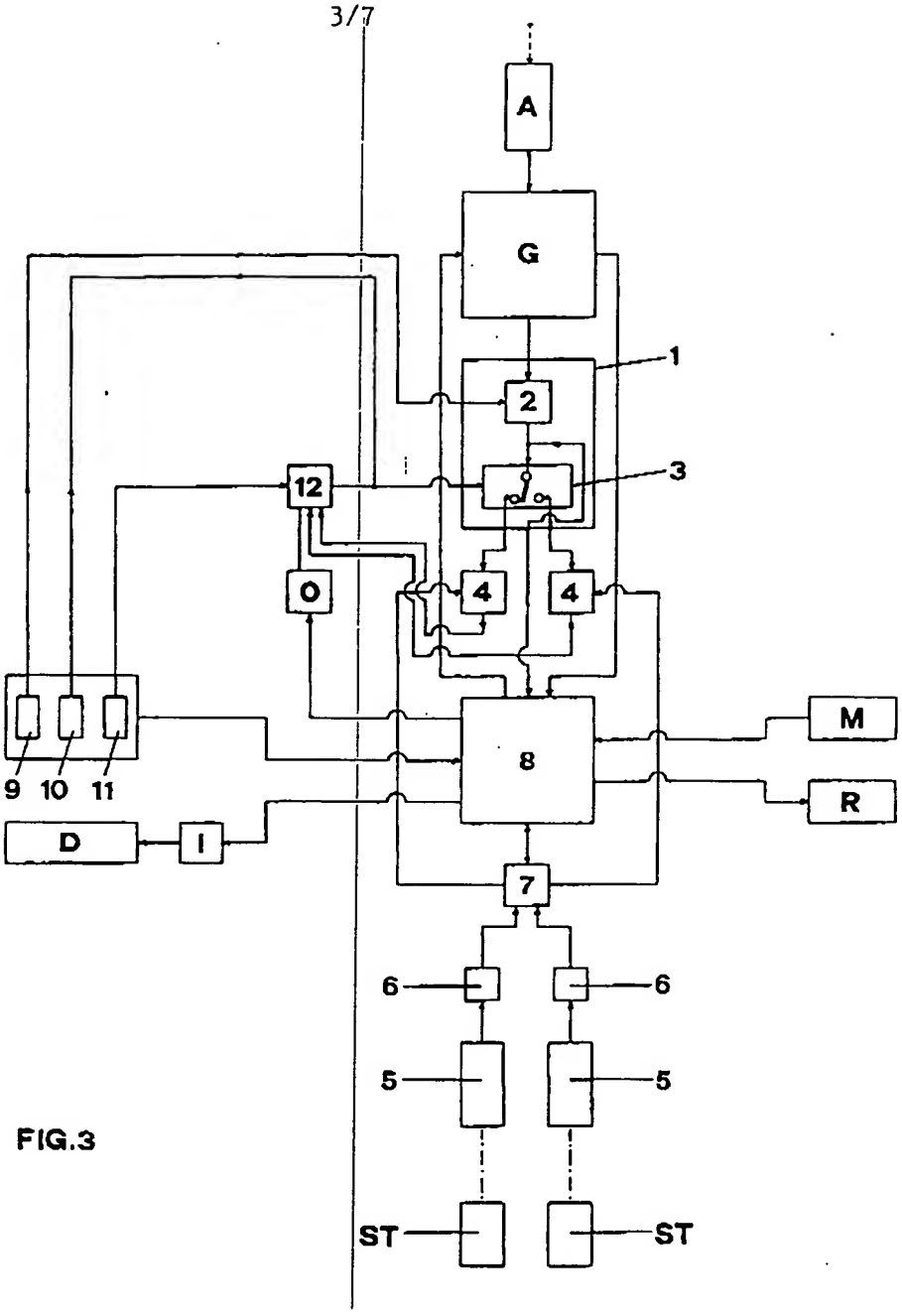

FIG.3

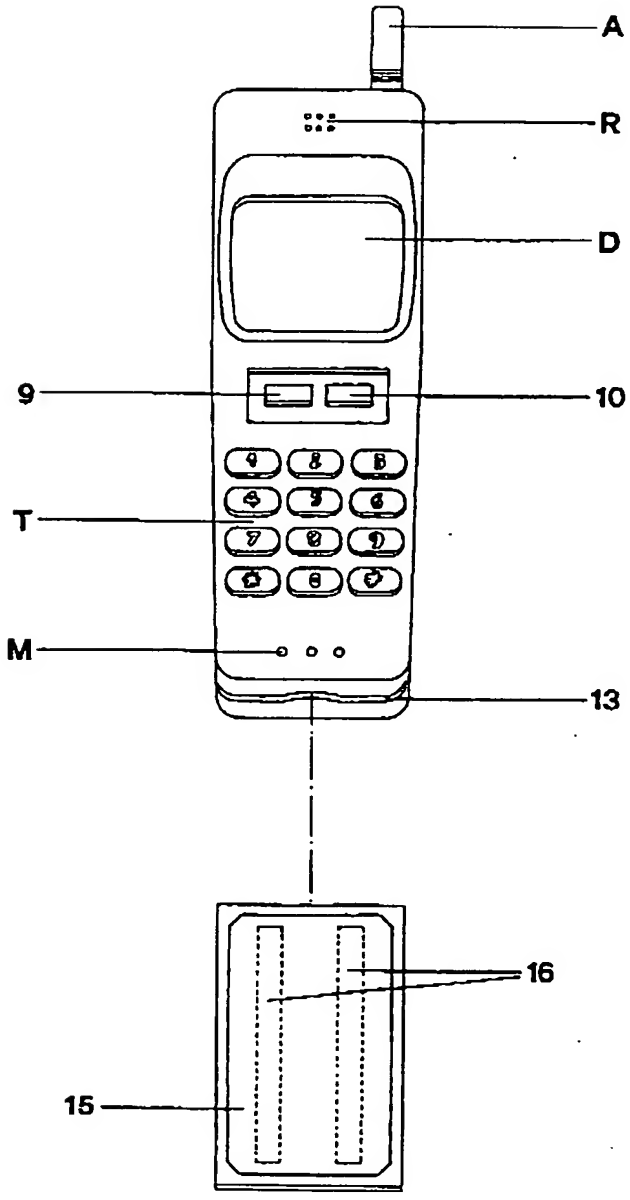

FIG.4

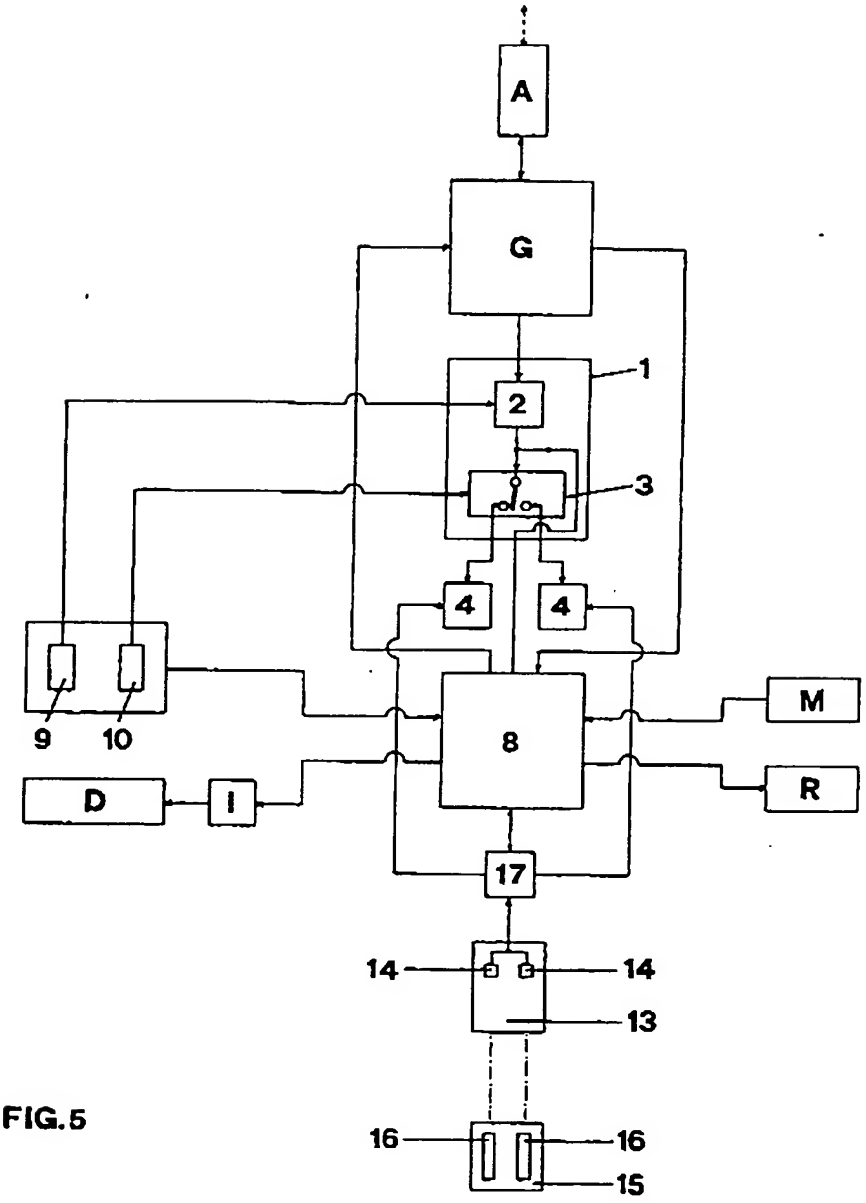

FIG.5

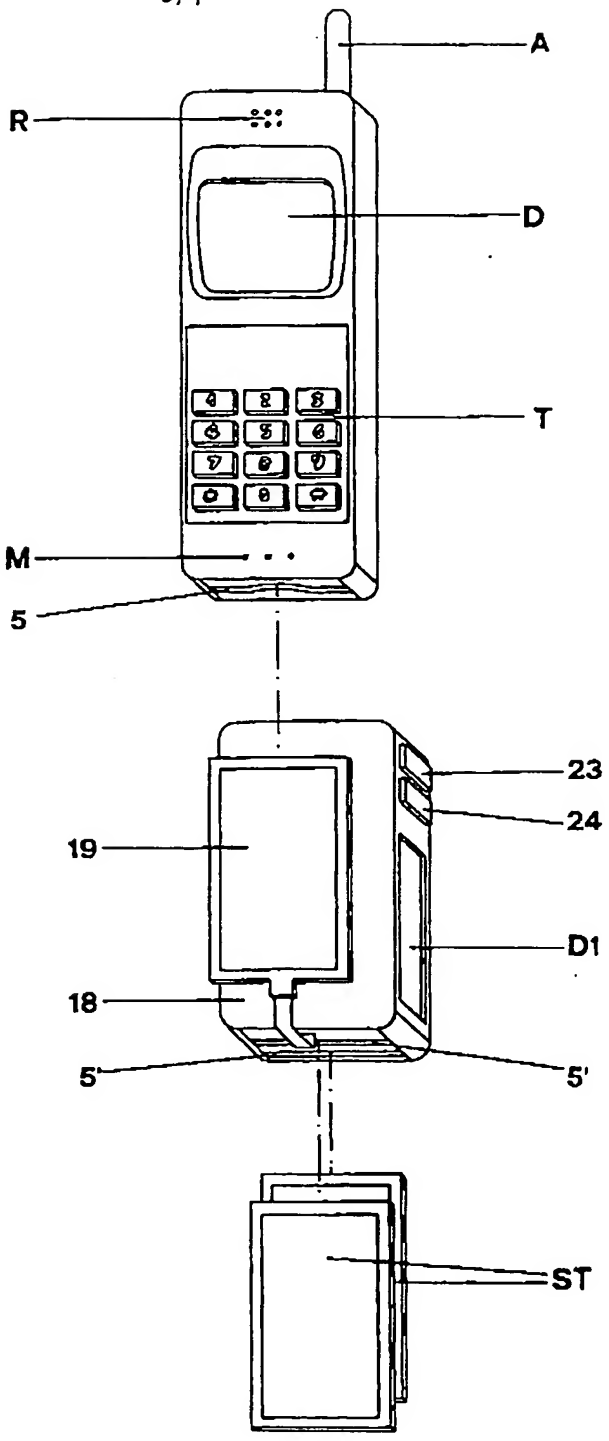

FIG.6

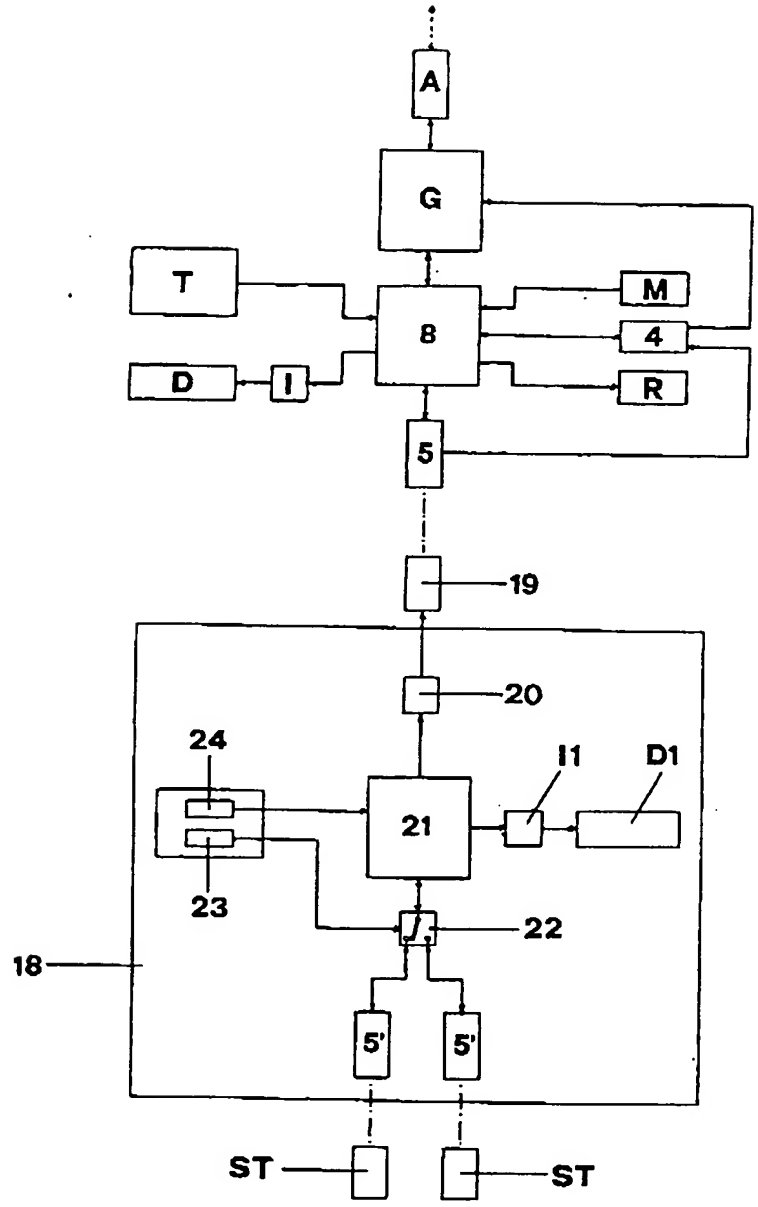

FIG.7

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IT 98/00048

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	WO 97 05729 A (TELECOM ITALIA MOBILE S P A ;SENTINELLI MAURO (IT)) 13 February 1997 see page 2, line 16 - page 4, line 24	1,5
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Information on patent family members

Int. ional Application No
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